

INSTRUMENT FOR ELECTROSURGICAL TISSUE TREATMENT

ABSTRACT OF THE DISCLOSURE

Systems and methods are provided for applying a high frequency voltage in the presence of an electrically conductive fluid to create a relatively low-temperature plasma for ablation of tissue adjacent to, or in contact with, the plasma. In one embodiment, an electrosurgical probe or catheter is positioned adjacent the target site so that one or more active electrode(s) are brought into contact with, or close proximity to, a target tissue in the presence of electrically conductive fluid. High frequency voltage is then applied between the active electrode(s) and one or more return electrode(s) to non-thermally generate a plasma adjacent to the active electrode(s), and to volumetrically remove or ablate at least a portion of the target tissue. The high frequency voltage generates electric fields around the active electrode(s) with sufficient energy to ionize the conductive fluid adjacent to the active electrode(s). Within the ionized gas or plasma, free electrons are accelerated, and electron-atoms collisions liberate more electrons, and the process cascades until the plasma contains sufficient energy to break apart the tissue molecules, causing molecular dissociation and ablation of the target tissue.